Regulatory Oversight Report for Canadian Nuclear Laboratories Sites: 2019

Commission Meeting
December 10, 2020
CMD 20-M22.C

Updates to CMD 20-M22 and CMD 20-M22.A

- Update on the Whiteshell Laboratories Security Order
- Correction to PHAI RLTIs
  - Section 4.3 of CMD 20-M22
  - Slide 31 of CMD 20-M22.A
- Correction to implementation status of REGDOC 2.2.4, Volume II
  - Table B-1 of CMD 20-M22
- Minor edits to the slides for clarity

Outline

- Overview
- Canadian Nuclear Laboratories (CNL) Sites and Facilities
- CNSC Regulatory Oversight
- CNSC Staff Assessment
- Other Matters of Regulatory Interest
- Key Themes of Interventions
- Conclusions

Regulatory Oversight Report for Canadian Nuclear Laboratories Sites: 2019
CMD 20-M22.C

OVERVIEW

Regulatory Oversight Reports

- Annual Report from CNSC staff to the Commission for information
- Presented by CNSC staff in public Commission proceedings
  - Licensee participation
  - Public and Indigenous participation
  - Participant Funding provided

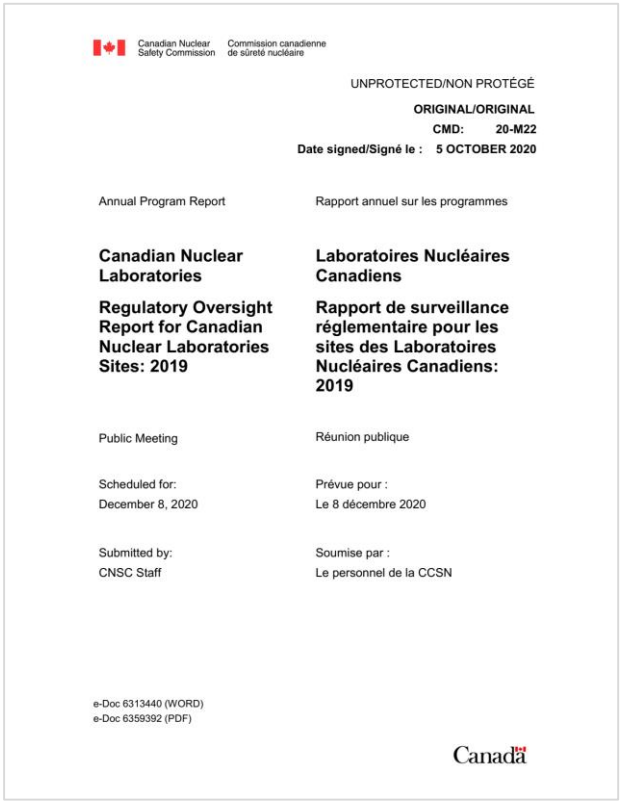
The Regulatory Oversight Report is an overview of CNSC regulatory efforts in assessing licensee performance

CNSC Regulatory Oversight Reports - 2019

- **November 5, 2020:** Use of Nuclear Substances in Canada
- **December 8-10, 2020:**
  - Uranium Processing and Nuclear Substance Processing Facilities
  - Canadian Nuclear Power Generating Sites
  - Canadian Nuclear Laboratories Sites
  - Uranium Mines and Mills

CNL Regulatory Oversight Report: 2019

- CNL sites and facilities
- CNSC regulatory oversight of CNL
- CNSC staff assessment of safety at CNL sites
  - Radiation protection, environmental protection, conventional health and safety
  - Ratings for CNL sites against the CNSC's 14 safety and control areas (SCAs)
- Events and other matters of regulatory interest



Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

UNPROTECTED/NON PROTÉGÉ

ORIGINAL/ORIGINAL
CMD: 20-M22
Date signed/Signé le : 5 OCTOBER 2020

Annual Program Report

Rapport annuel sur les programmes

Canadian Nuclear Laboratories

Regulatory Oversight Report for Canadian Nuclear Laboratories Sites: 2019

Laboratoires Nucléaires Canadiens

Rapport de surveillance réglementaire pour les sites des Laboratoires Nucléaires Canadiens: 2019

Public Meeting

Réunion publique

Scheduled for:
December 8, 2020

Prévue pour :
Le 8 décembre 2020

Submitted by:
CNSC Staff

Soumise par :
Le personnel de la CCSN

e-Doc 6313440 (WORD)
e-Doc 6359392 (PDF)

Canada

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CNL SITES AND FACILITIES

ROR Canadian Nuclear Laboratories Sites: 2019
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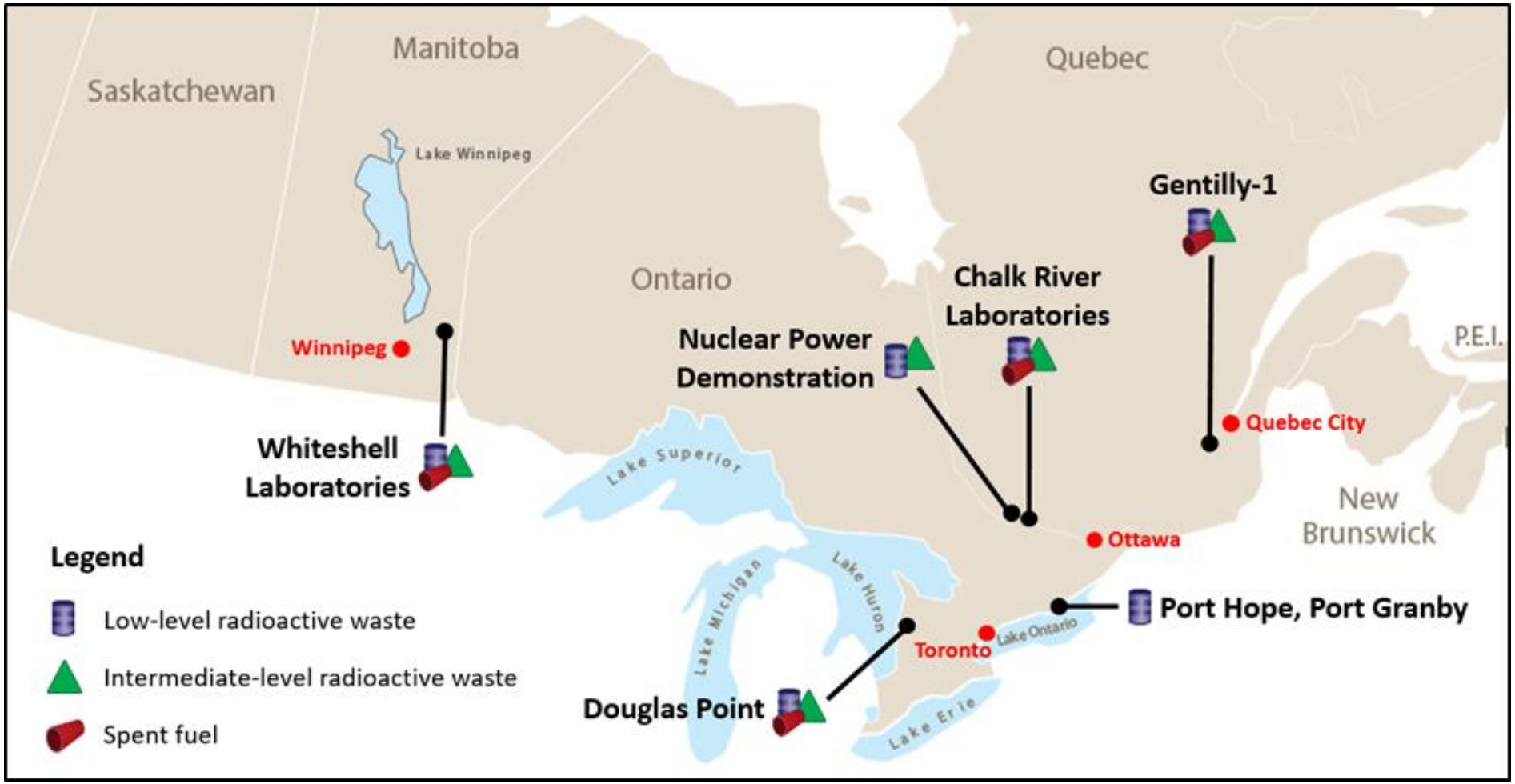
CNL Sites and Facilities



Licences Covered by this Report

Site /Facility/Project	Licence Number
Chalk River Laboratories (CRL)	NRTEOL-01.00/2028
Whiteshell Laboratories (WL)	NRTEDL-W5-8.05/2019*
Port Hope Project (PHP)	WNSL-W1-2310.02/2022
Port Granby Project (PGP)	WNSL-W1-2311.02/2021
Douglas Point (DP) Waste Facility	WFDL-W4-332.02/2034
Gentilly-1 (G-1) Waste Facility	WFDL-W4-331.00/2034
Nuclear Power Demonstration (NPD) Waste Facility	WFDL-W4-342.00/2034
Port Hope Pine Street Extension Temporary Storage Site	WNSL-W1-182.1/2021
Port Hope Radioactive Waste Management Facility	WNSL-W1-344-1.8/ind

**WL licence renewed in 2020 calendar year – expiry date is December 31, 2024*

Significant Licensing Changes in 2019

Site, Facility or Project	Licence Changes	Licence Conditions Handbooks (LCH) Changes
Chalk River Laboratories	None	Revised LCH issued February 2019 reflecting NRU shutdown and cessation of Mo-99 production
Whiteshell Laboratories	New 5-year licence issued January 2020 (CMD 19-H4)	New LCH issued January 2020 reflecting licence issued
Port Granby Project	Licence amendment request to incorporate Release Limits for the new Waste Water Treatment Plant granted, April 2019 (CMD 19-H101)	New LCH issued April 2019 reflecting licence amendment
Douglas Point, Gentilly-1 & Nuclear Power Demonstration waste facilities	Request for separation of single licence into three individual licences for each site granted, February 2019 (CMD 18-H107)	Three new LCHs issued, one applicable to each site: • NPD issued April 2019 • DP issued June 2019 • G-1 issued July 2019

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CMD 20-M22.C

CNSC REGULATORY OVERSIGHT

Regulatory Effort

- Includes licensing, compliance verification and reporting to the Commission
- CNSC staff conduct regulatory verification of licensee programs, processes and reports through:
  - inspections
  - reviews of operational activities and documentation
  - reviews of licensee reporting, including annual reports, performance data, and events

Risk-informed and performance-based approach

CNSC Staff Regulatory Focus - CRL

- Oversight of CNL's decommissioning of legacy facilities and the planning and construction of new facilities
- Monitoring the repatriation of highly enriched uranium to the United States
- Continuing the assessment of CNL's proposal to construct and operate a Near-Surface Disposal Facility and CNL's plan to host a Small Modular Reactor

CNSC staff performing inspections at Chalk River Laboratories

CNSC Staff Regulatory Focus - WL

- Assessing CNL's application for a 10-year licence renewal
  - decommissioning licence renewed by the Commission for a 5-year period expiring December 2024
  - subsequent ALARA assessment addressing the impacts of accelerated decommissioning
- Inspecting CNL's waste management and decommissioning work throughout the site
- Continuing the assessment of CNL's safety case for proposed in-situ decommissioning of the WR-1 reactor

Emergency exercise that was the focus of a CNSC inspection at Whiteshell Laboratories

Security SCA at WL

- CNSC staff identified deficiencies with the security arrangements at WL
  - Order issued in 2018
  - Performance rating in 2018 and 2019 was Below Expectations (BE)
- No immediate risk to security of nuclear substances
  - Acceptable compensatory measures are in place
- CNL has implemented a corrective action plan accepted by CNSC staff
  - CNL has completed all actions identified in the corrective action plan to CNSC staff's satisfaction
- Order was closed by the Designated Officer in November 2020

CNSC Staff Regulatory Focus - PHP

- Inspecting CNL's continued construction of the Port Hope Long-Term Waste Management Facility (LTWMF)
- Monitoring receipts of off-site waste at the LTWMF
- Assessing CNL's management and treatment of impacted water
- Monitoring remediation activities at the Port Hope Harbour Centre Pier, commercial properties, and residential properties

CNSC Staff performing inspections at the Port Hope Project

CNSC Staff Regulatory Focus - PGP

- Monitoring CNL's excavation of legacy waste, and its transfer to the Port Granby LTWMF
- Assessing CNL's management and treatment of impacted water
- Inspecting CNL's activities in capping the Port Granby LTWMF

CNSC Staff performing an inspection at the Port Granby Project

CNSC Staff Regulatory Focus - Prototype Power Reactors (NPD, G-1 and DP)

- Inspecting CNL's ongoing hazard reduction and waste characterization work, in preparation for full decommissioning
- Assessing CNL's safety case for proposed in-situ decommissioning of the NPD reactor
- Assessing CNL's request to separate the single licence that covered these sites – three separate licences issued
- Monitoring CNL's implementation of storage-with-surveillance activities

CNSC Staff performing an inspection at G-1

Regulatory Effort in 2019

Site, Facility or Project	Inspections	Person Hours of Compliance Work	Person Hours of Licensing Work	Licensing and Compliance	
				Total Effort	Trend Since 2018
Chalk River Laboratories[a]	7	9,678	6,636	16,314	⇩
Whiteshell Laboratories[b]	4	2,253	6,750	9,003	⇧
Port Hope Project	8	2,948	155	3,103	⇩
Port Granby Project	7	1,584	132	1,716	⇩
Douglas Point	1	310	670	980	⇩ *
Gentilly-1	1	168	52	220	
Nuclear Power Demonstration[c]	0	465	1,718	2,183	
Total	**28**	**17,406**	**16,113**	**33,519**	⇩

a Includes CNSC staff effort on the ongoing Environmental Assessment, *Near Surface Disposal Facility Project*
b Includes CNSC staff effort on the ongoing Environmental Assessment, *In Situ Decommissioning on the Whiteshell Reactor #1*
c Includes CNSC staff effort on the ongoing Environmental Assessment, *Nuclear Power Demonstration Closure Project*
* Unable to compare direct effort for individual facilities between years as effort in 2018 was combined for all 3 facilities under one consolidated licence.

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CMD 20-M22.C

CNSC STAFF ASSESSMENT

Safety and Control Areas (SCAs)

- CNSC staff have rated CNL's performance based on results from regulatory oversight activities as Satisfactory (SA) or Below Expectations (BE)
- This report focuses on the environmental protection, radiation protection, and conventional health and safety SCAs

CNSC Safety and Control Areas (SCAs)
Management system
Human performance management
Operating performance
Safety analysis
Physical design
Fitness for service
Radiation protection
Conventional health and safety
Environmental protection
Emergency management and fire protection
Waste management
Security
Safeguards and non-proliferation
Packaging and transport

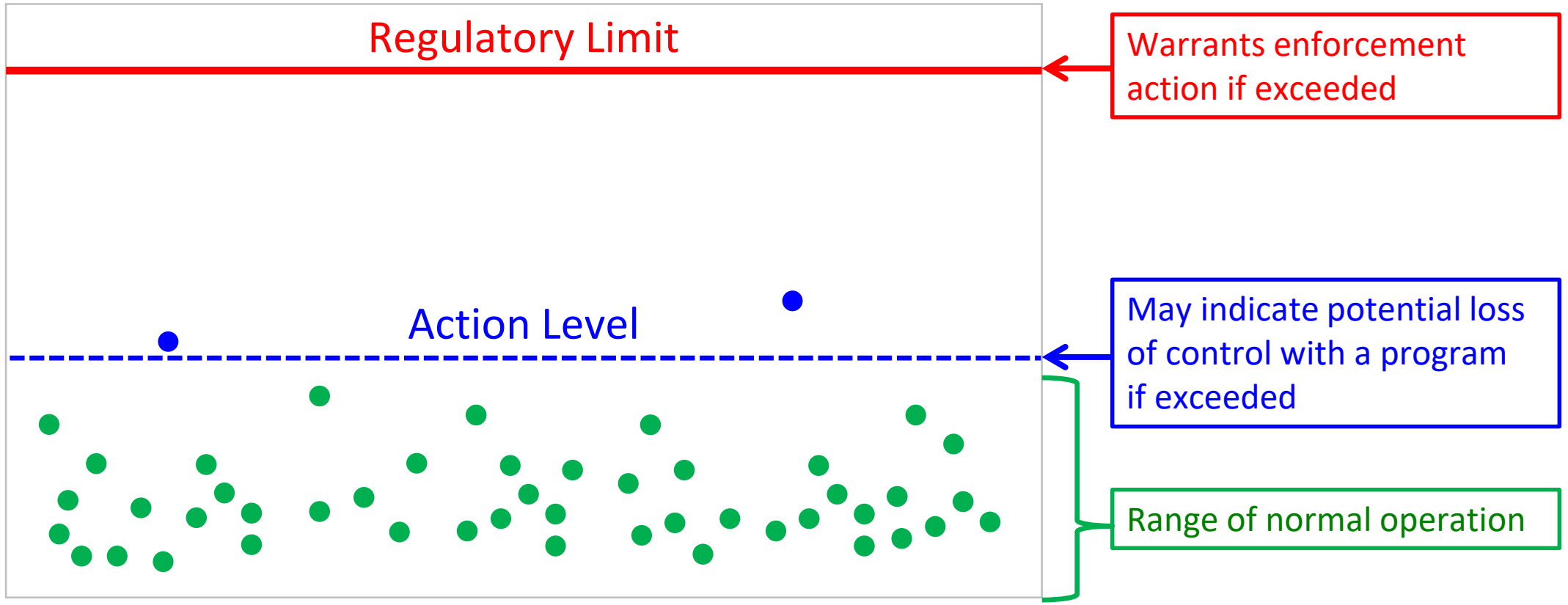
CNSC staff assess and rate licensee performance for all SCAs

Satisfactory (SA)
Below expectations (BE)

CNL 2019 SCA Performance Ratings

Safety and control area	Chalk River Laboratories	Whiteshell Laboratories	Port Hope Project	Port Granby Project	Douglas Point	Gentilly-1	Nuclear Power Demonstration
Management system	SA	SA	SA	SA	SA	SA	SA
Human performance management	SA	SA	SA	SA	SA	SA	SA
Operating performance	SA	SA	SA	SA	SA	SA	SA
Safety analysis	SA	SA	SA	SA	SA	SA	SA
Physical design	SA	SA	SA	SA	SA	SA	SA
Fitness for service	SA	SA	SA	SA	SA	SA	SA
Radiation protection	SA	SA	SA	SA	SA	SA	SA
Conventional health and safety	SA	SA	SA	SA	SA	SA	SA
Environmental protection	SA	SA	SA	SA	SA	SA	SA
Emergency management and fire protection	SA	SA	SA	SA	SA	SA	SA
Waste management	SA	SA	SA	SA	SA	SA	SA
Security	SA	BE	SA	SA	SA	SA	SA
Safeguards and Non-proliferation	SA	SA	SA	SA	SA	SA	SA
Packaging and transport	SA	SA	SA	SA	SA	SA	SA

Regulatory Limits and Action Levels



Environmental Protection Performance

- Three action level exceedances for releases of radioactive substances to air at CRL
  - Two related exceedances in adjacent weeks at the waste management facilities due to transfer of waste bags with higher than normal quantities of tritium
  - One exceedance at the Universal Cells facility due to internal cross contamination from a higher activity cell to a lower activity cell
- One action level exceedance for effluent at PGP
  - Exceedance of arsenic, uranium, molybdenum and radium-226 due to high influent feed water concentration and temperature

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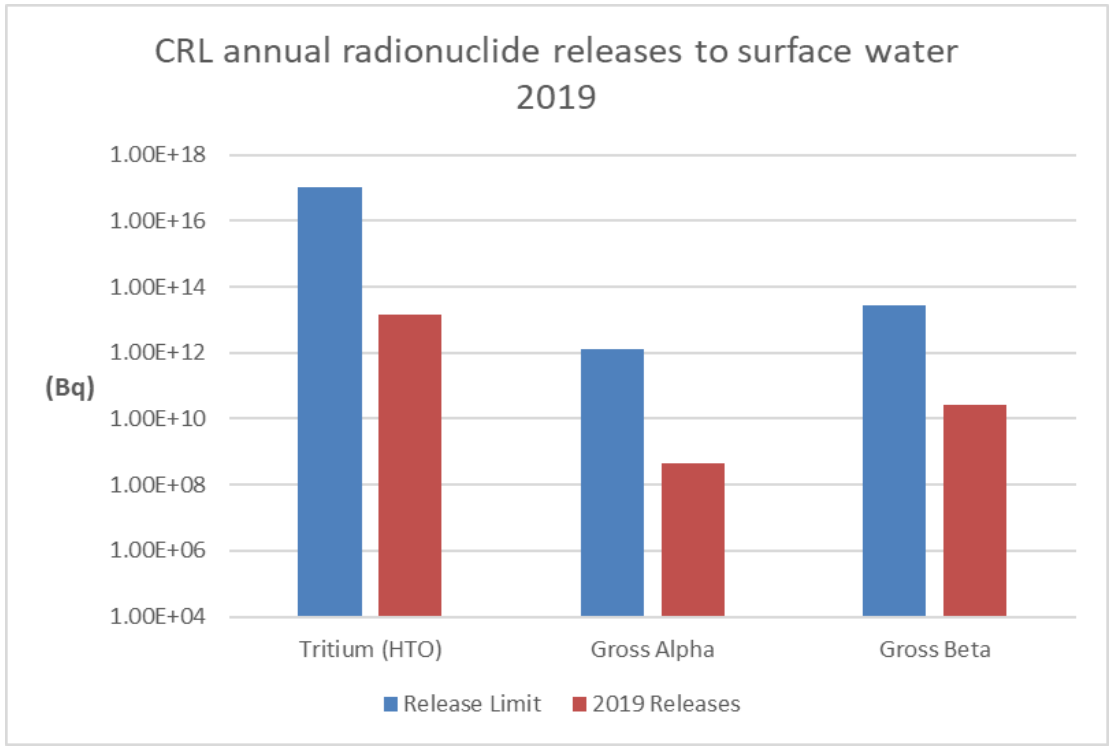
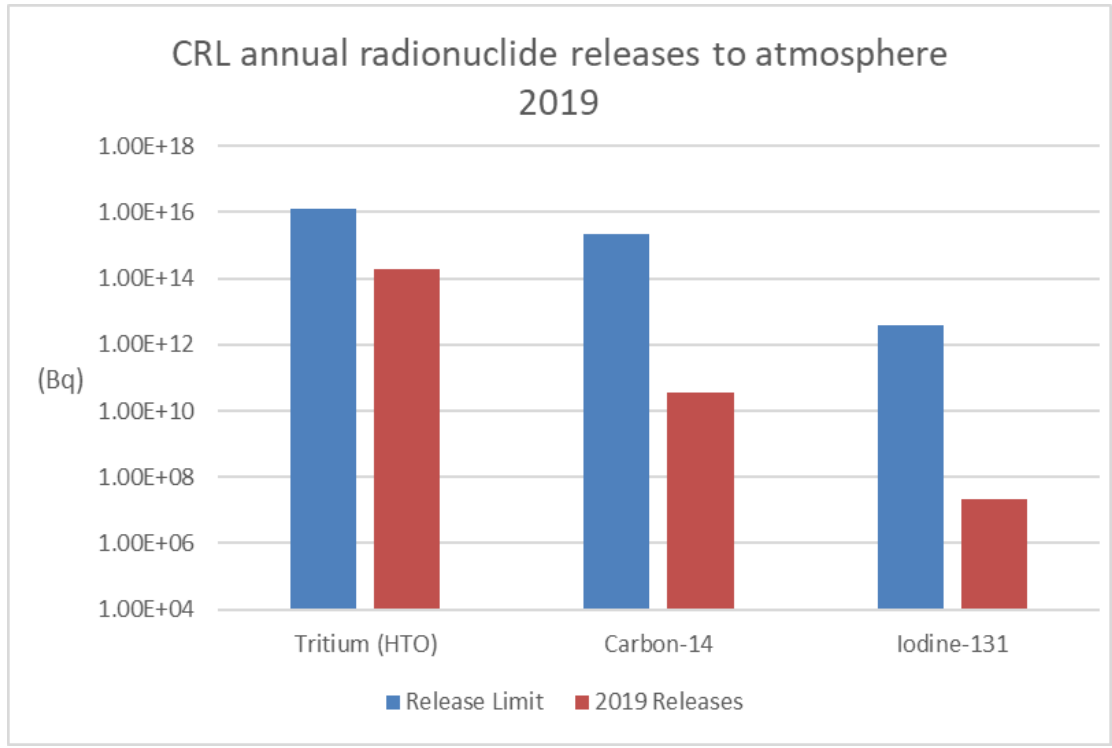
CMD 20-M22.C

Releases to the Environment 2019 - CRL





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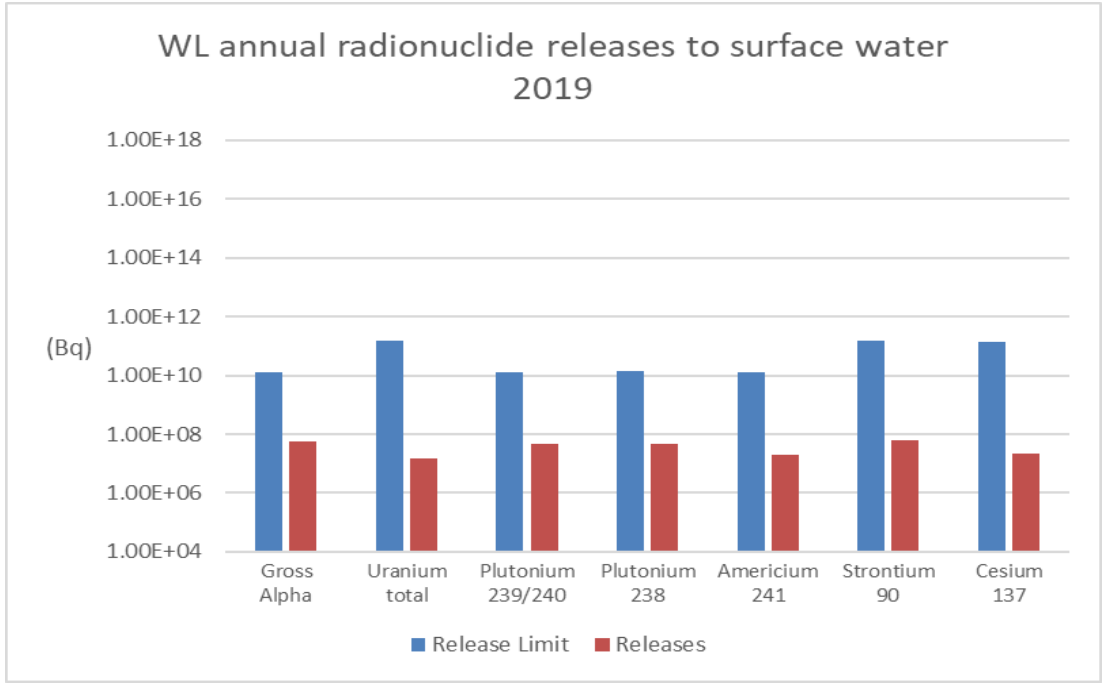
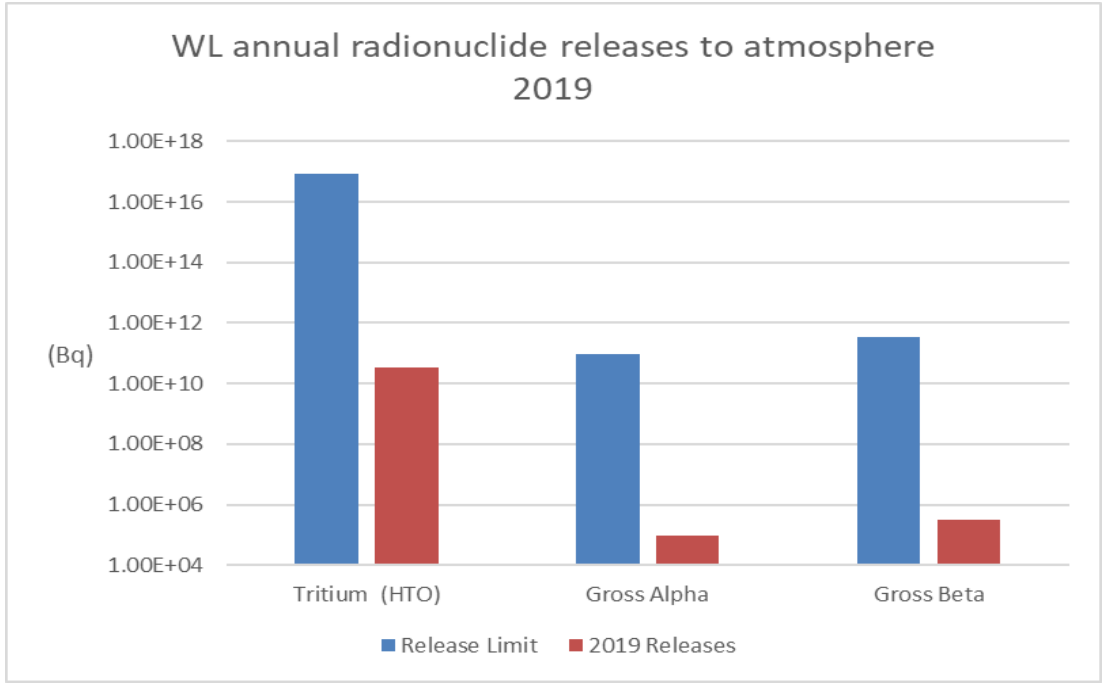
Releases to the Environment 2019 - WL



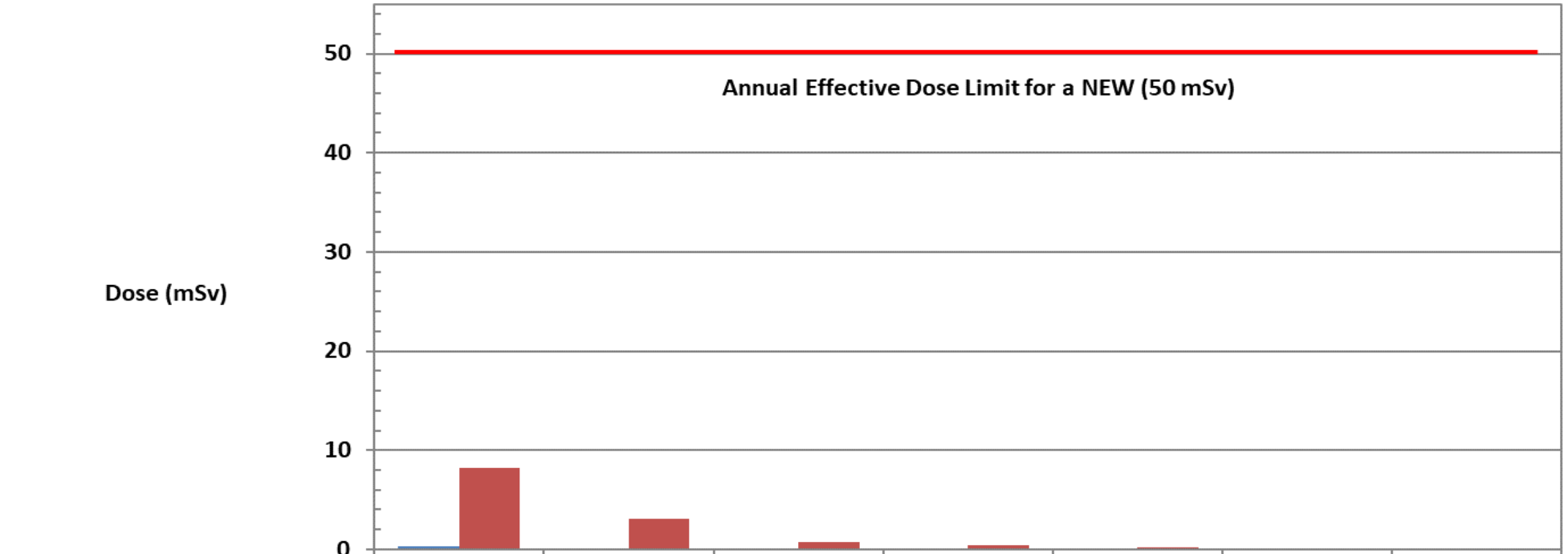


CNL's environmental protection programs are effective in controlling environmental releases

Radiation Protection Performance

- CNL's corporate and site-level programs were effective in controlling radiological hazards
- No RP action level exceedances in 2019
- Doses to workers and the public were well below regulatory limits at all CNL sites

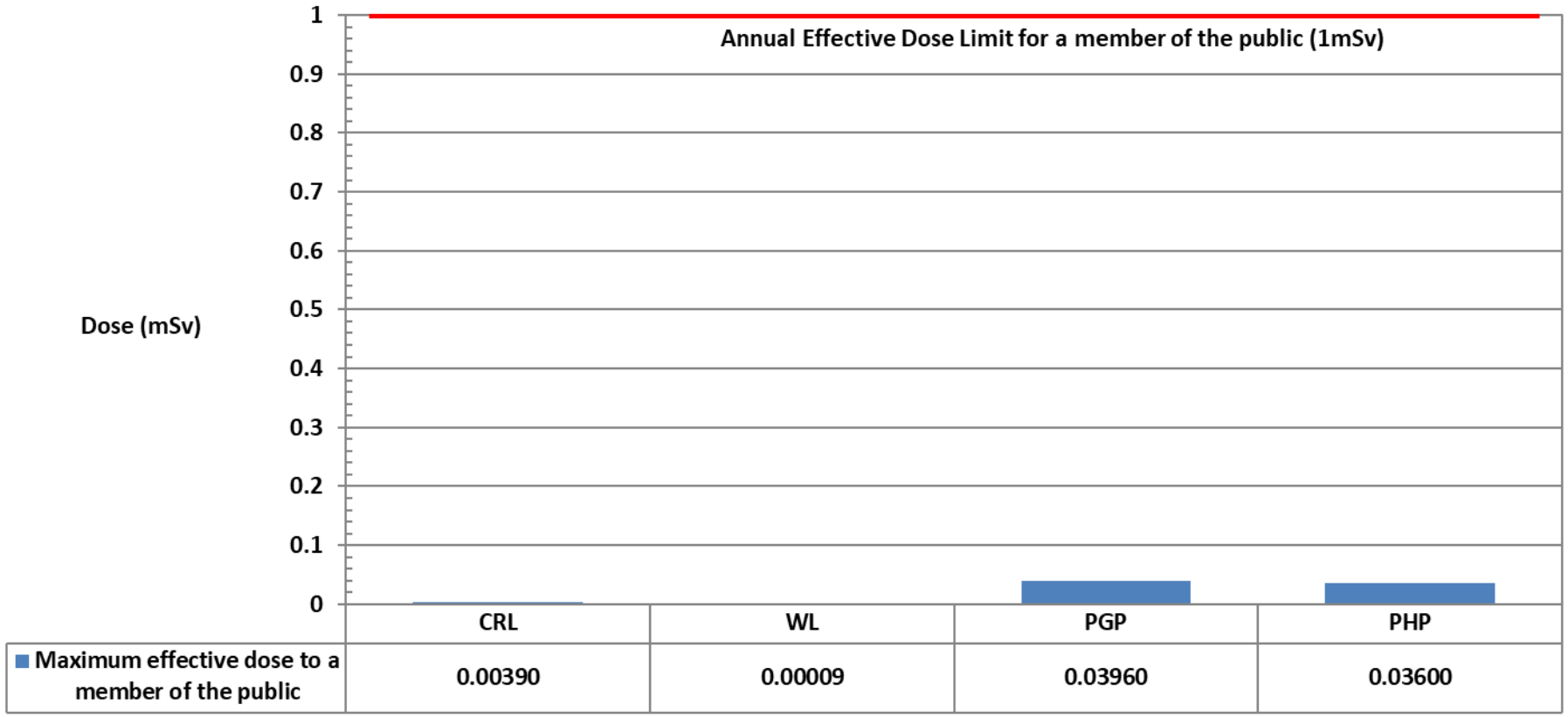
Doses to Nuclear Energy Workers 2019



	Chalk River Laboratories	Whiteshell Laboratories	Port Granby Project	Port Hope Project	Douglas Point	Nuclear Power Demonstration	Gentilly-1
Average Effective Dose (mSv)	0.27	0.10	0.05	0.04	0.02	0.03	0.01
Maximum Effective Dose (mSv)	8.23	3.09	0.79	0.38	0.24	0.05	0.10

Radiation doses remain ALARA

Estimated Dose to the Public 2019



Dose to the public remains low

Conventional Health and Safety 2019 (1/2)

- Key performance indicators for conventional health and safety:
  - Recordable lost-time injuries (RLTI)
  - RLTI frequency
  - RLTI severity
- RLTIs were recorded at CRL, PHP and PGP

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CMD 20-M22.C

Conventional Health and Safety 2019 (2/2)

CNL Staff	CRL	WL	NPD	G-1	DP	PHP	PGP
Person Hours Worked	5 729 010	642,000	>20,000	9,040	35,880	298,377	41, 622
Lost-Time Injuries	1	0	0	0	0	1	1
Working Days Lost	75	0	0	0	0	33	1
Frequency[a]	0.03	0	0	0	0	0.68	4.81
Severity[b]	2.62	0	0	0	0	22.57	4.81

a Frequency Rate : number of Lost-Time Injuries x 200 000 hrs of exposure divided by person hours worked (based on 100 Full Time Workers)
b Severity rate : number of working days lost x 200 000 hrs of exposure divided by person hours worked (based on 100 Full Time Workers)

Contractor staff	CRL	WL	NPD	G-1	DP	PHP	PGP
Lost-Time Injuries	0	0	0	0	0	1	1

CNL maintains effective oversight of health and safety

Event Reporting at CNL Sites (1/2)

- For applicable sites, CNL is required to report specific types of events involving its licensed activities, in accordance with REGDOC-3.1.2
- CNSC staff analyze all event reports
- CNSC staff are satisfied with CNL's corrective actions

Site	# of Events
Chalk River Laboratories	21
Whiteshell Laboratories	1
Port Hope Project	0
Port Granby Project	5
Douglas Point Waste Facility	0
Gentilly-1 Waste Facility	0
Nuclear Power Demonstration Waste Facility	0

CNL met event reporting requirements in 2019

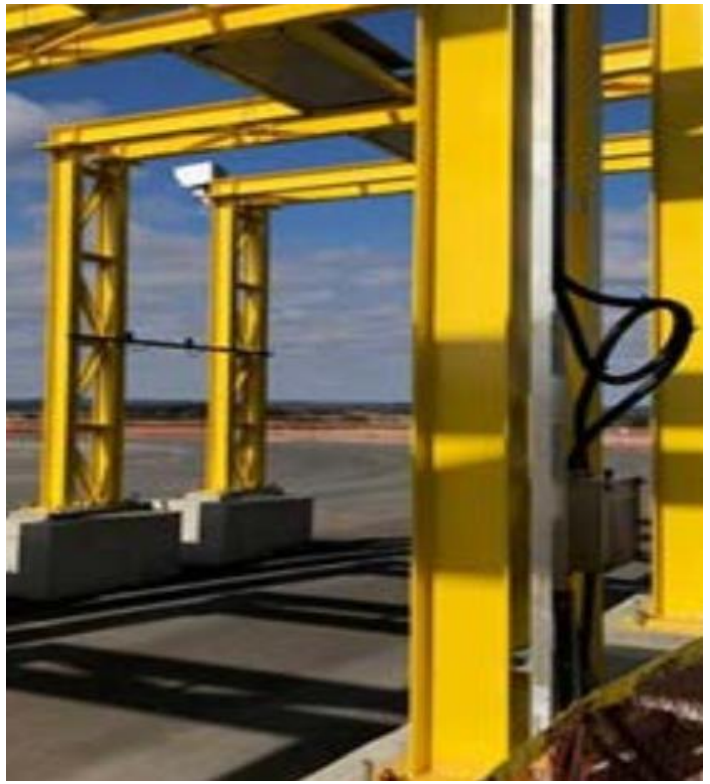
Event Reporting at CNL Sites (2/2)

- Significant events are reported to the Commission as Event Initial Reports (EIRs)
- Two EIRs reported for CNL sites and presented to the Commission in February 2019:
  - Contractor injured on January 9, 2019 at Port Granby Project, CMD 19-M9
  - Power Outage on February 3, 2019 at Chalk River Laboratories, CMD 19-M10
    - CNSC staff follow up inspection completed in March 2020
  - CNSC staff are satisfied that CNL responded appropriately and implemented appropriate corrective actions

IAEA Safeguards at CNL Sites

- The IAEA carries out inspections at nuclear sites in Canada to verify their exclusively peaceful nature
- CNSC staff participate in most IAEA activities
- No significant issues identified at CNL sites in 2019

	# of IAEA Activities in 2019
Chalk River Laboratories	44
Whiteshell Laboratories	1
Port Hope Project	3
Douglas Point	3
Gentilly-1	1



The IAEA's unattended portal monitor at the Port Hope LTWMF (courtesy IAEA)

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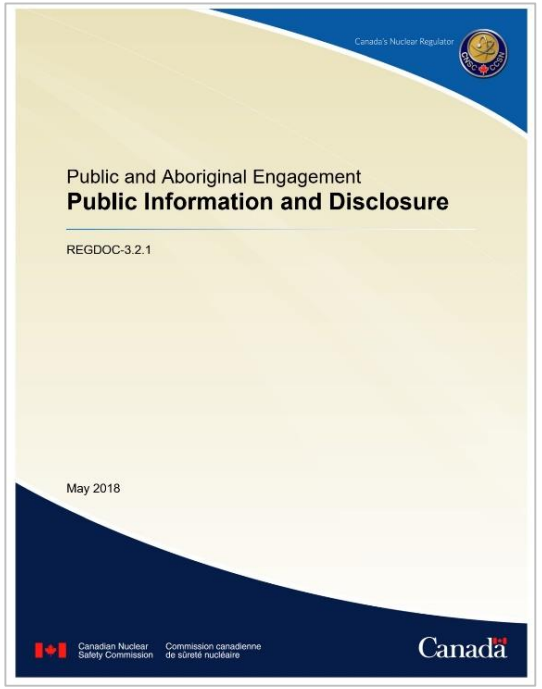
CMD 20-M22.C

OTHER MATTERS OF REGULATORY INTEREST

Public Engagement (1/2)

- REGDOC-3.2.1, *Public Information and Disclosure*
- Comprehensive inspection of CNL's Public Information Program for the PHP and PGP



CNSC staff review CNL's engagement efforts to ensure compliance with requirements

Public Engagement (2/2)

- CNSC staff routinely conduct outreach activities. Examples include:
  - Engagement through dedicated sessions (e.g., open houses) and relevant community events (e.g., fairs)
  - Participation in licensee events
- Information is shared through CNSC website and social media channels
- CNSC hosted public webinars for this report

CNSC staff at an outreach event

CNSC Indigenous Engagement

CNL sites fall within the traditional and treaty territories of many Indigenous communities

- CNSC staff inform Indigenous groups of this report and participant funding opportunities
- CNSC staff continue to engage and identify opportunities to discuss and address all topics of interest and concern

CNSC Outreach with the Algonquins of Pikwakanagan First Nation

CNSC is committed to building long-term relationships with Indigenous groups

CNL Indigenous Engagement

- CNL has a dedicated Indigenous engagement program
  - Consistent with the requirements and guidance of REGDOC-3.2.2, *Indigenous Engagement*
  - Includes emails, letters, meetings, site visits and tours, community visits, workshops, the development of collaborative agreements, and the incorporation of Indigenous Knowledge

CNSC staff are satisfied with Indigenous engagement conducted by CNL

Participant Funding Program (PFP)

Independent Funding Review Committee recommended funding to:

Recipient	Amount (up to)
Algonquins of Ontario	$11,700
Canadian Environmental Law Association	$5,880
Grand Council Treaty #3	$4,000
Manitoba Métis Federation	$11,700
Concerned Citizens of Renfrew County	$2,500
Curve Lake First Nation	$5,676

CNSC made up to $41,456 available through PFP

Independent Environmental Monitoring Program (IEMP) (1/2)

- CNSC's IEMP complements the CNSC's compliance verification activities
- Samples are taken from publicly-accessible areas and analysed at the CNSC's laboratory
- Results posted on CNSC website: http://www.nuclearsafety.gc.ca/eng/resources/maps-of-nuclear-facilities/iemp/index-iemp.cfm

IEMP (2/2)

CNSC has performed IEMP at CNL sites in the past 3 years as follows:

- CRL – 2019
- WL – 2017
- PHP – 2019
- PGP – 2019
- DP – 2019
- NPD – 2018
- G-1 – 2018

CNSC staff collecting water samples along the shores of Lake Ontario in July 2019

IEMP results confirm that the public and environment are protected

Major Projects Proposed on CNL Sites

CNSC staff continue the technical assessments of the following proposals:

- Construction of a **Near-Surface Disposal Facility** at the Chalk River site
- In-situ decommissioning of the **NPD** and **WR-1** reactors
- Construction of a **micro-modular reactor** at the Chalk River site

Environmental Assessment and Licensing decisions from the Commission are required for each of these proposals

Regulatory Oversight Report for Canadian Nuclear Laboratories Sites: 2019
CMD 20-M22.C

KEY THEMES FROM INTERVENTIONS

Key Themes in Interventions (1/3)

- Eight interventions were received
- CNSC staff observed the following key themes:
  - Indigenous engagement and consultation
  - Content and scope of the Regulatory Oversight Report

Recommendations and concerns from interventions dispositioned in CMD 20-M22.B

Key Themes in Interventions (2/3)

Indigenous Engagement and Consultation

- Indigenous groups requested more engagement, information, and additional opportunities to participate in CNSC processes
- Distinction between Indigenous vs general public information
- CNSC staff engage with Indigenous groups when planning IEMP activities
- CNSC staff are working on terms of engagement with other groups, and are committed to ongoing engagement and information sharing with all interested Indigenous groups

Key Themes in Interventions (3/3)

Content of CNSC Regulatory Oversight Reports

- Interveners request further information be provided in all Regulatory Oversight Reports
- Recommendations for content to be included in the 2019 CNL Regulatory Oversight Report and specific information requests related to this report

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CMD 20-M22.C

CONCLUSIONS

Conclusion

- CNSC staff performed regulatory oversight activities for CNL sites in 2019, and conclude that:
  - environmental releases were below regulatory limits
  - doses to workers and the public were below regulatory limits
  - workers were protected from conventional health and safety risks

2020 Regulating Under COVID-19 Restrictions

- Refer to CMD 20-M36 for more information on CNSC response to COVID-19 and modified oversight approach for the nuclear fuel cycle program
- CNL implemented business continuity plans and reduced onsite workforce to essential workers only (less than 10% of usual workforce) in March 2020 and focused on critical work at CNL sites
- CNSC staff continued:
  - Inspections using a combination of remote and onsite methods
  - Conduct of desktop reviews of licensee reports and submissions
  - Remote engagement with Indigenous groups and the public

Safety and security maintained at all times

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